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PULEX AQUATICUS ARBORESCENS*

(Matriarchy, Off-beat Heredity, Bioassay, Eutrophication)

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The Presidential Address for the 84th Annual Meeting of the Ohio Academy of Science (at Denison University), delivered at the Annual Banquet Friday, April 25, 1975, discussed the natural history of the water fleas Cladocera (Arthropoda, Crustacea) and specific research projects involving them. The following condensation portrays the general nature of the address.

The still-confused status of cladoceran taxonomy was touched upon and highlights of cladoceran anatomy were described and illustrated. Their typical life-history was recounted, with special attention to their uniquely adaptive reproductive pattern. Under optimum conditions a population will consist entirely of females reproducing parthenogenetically but when environmental conditions become rigorous male young are produced. Later the females have eggs which require fertilization for development. These eggs are protected by a special portion of the shell and can undergo long periods of diapause during desiccation. The perfection of such a pattern for life in temporary ponds is obvious.

The extensive research program of L.A. Brown (the speaker's personal banquet guest) on the environmental control of male production was reviewed. These investigations led to the conclusion that the critical factors for male production were a concentration of body wastes in the surrounding medium which acted to slow the mother's metabolism during a critical stage in egg development.

The speaker then reviewed three of his own investigations. The first of these—a study of the effects of starvation on future broods and generations of *Daphnia pulex* (de Geer)— resulted in the demonstration of an apparent cytoplasmic transmission of the effects of continued starvation. Length of life and fecundity were both influenced to a statistically significant degree by the post-nutritional history of the *Daphnia*.

The second project involved ascertaining the minimum lethal concentrations of fourteen industrial waste substances to adult *Daphnia magna* Straus and comparing these with previously determined lethal concentrations of those substances for first instar young. The overall conclusion of this study was that the occurrence of a molt during the period of exposure was a much more critical factor than was age differential.

Finally, the speaker descirbed his field collecting program of the Cladocera and Copepoda of western Lake Erie (1948–49) and Cayuga Lake (1950–51) and reviewed his studies comparing those collections with earlier and later collection programs for both areas. The marked increase in numbers of both groups, documented quantitatively for the first time in 1964, showed the unmistakable development of eutrophication as it affected the entomostracan element of the fauna in both of the areas involved. The speaker closed with a note of caution against over-optimism when dealing with trend reversal in eutrophied lakes.

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